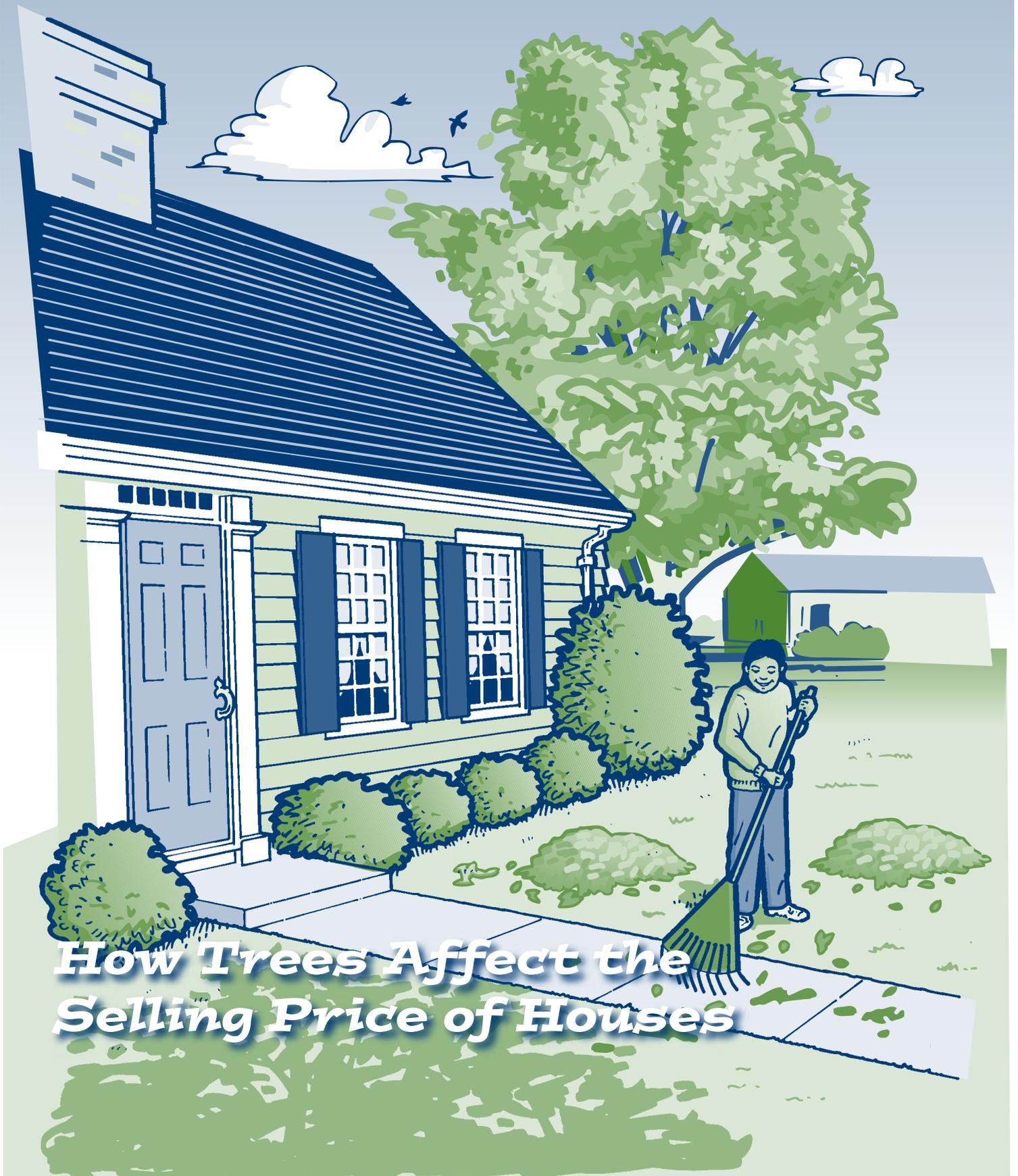


Yard Sale!



*How Trees Affect the
Selling Price of Houses*

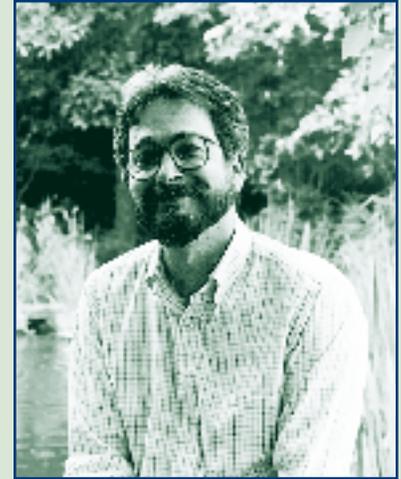
Meet the Scientists



Mr. Sydor: ▲ My favorite science experience is walking the road from knowing little about a specific problem to knowing almost everything. I also enjoy being able to apply the knowledge that I learned from textbooks to real-life situations.



Dr. Bowker: ▲ My favorite science experience is using what I learned in school to help solve problems related to people and nature.



Dr. Newman: ▲ My favorite science experience is discovering new things that help people to protect our environment and our *natural resources*.



Dr. Cordell: ◀ My most memorable and rewarding science experience came early in my career. It was the publication in a science journal of an article that I had written. The article was based on my *dissertation* research about urban forests. My research was about estimating the value of urban green spaces, including trees and forests in urban areas. It was a thrill to see my name on an article in a science publication. It was also great to get praise for my work from a person I greatly admired and respected.



Thinking About Science

What does the price of something represent? To *economic* scientists, the price of something represents its value to people. Economic scientists conduct a

type of science called economics. Economics is the study of the way in which goods and wealth are produced, distributed, and used in a society. This can include any good, including ones that you normally would not think of as being bought and sold.

Glossary:



natural resource (na cha rôl re sôrs): A supply of something in nature that takes care of a human need, such as oil.

dissertation (dis ür ta shun): A written essay, usually written by someone earning a Doctor of Philosophy degree.

economic (e kô nom ik): Having to do with the management of money.

habitat (hab uh tat): Environment where a plant or animal naturally grows and lives.

indicator (in di ka tôr): Something that measures or shows something.

average (av rij): The usual kind or amount. The number gotten by dividing the sum of two or more quantities by the number of quantities added.

canopy (kan uh pe): Anything that covers like a roof. On a tree, the area of leaves that cover the ground.

aerial (air e ul): Of or in the air.

equation (e kwa shun): A written statement that indicates the equality of two expressions.

relationship (re la shun ship): When two or more things are connected in some fashion.

Pronunciation Guide

a	as in ape	o	as in go	ü	as in fur
ä	as in car	ô	as in for	oo	as in tool
e	as in me	u	as in use	ng	as in sing
i	as in ice				

Accented syllables are in **bold**.

In this study, the scientist wanted to discover the value of trees growing in the yard around a house. Why do you think that it is important to know the value of trees growing around a house? Do you think that the value of something is reflected by its price? Why or why not? Think of something from this week's news that shows how the price of something is related to its value to people.



Thinking About the Environment

When people decide to buy a house, they have a lot of things to consider. They have to think about how many bedrooms and bathrooms they need. They have to think about where the house is located. For example, is it close to any schools or shopping, or to the bus stop? They have to think about how much they can afford to pay. One of the things that may be important is the amount of the yard that is shaded by trees.

Usually, when people think about the environment, they think about things like forests, lakes, or oceans. The environment also surrounds your home. It is important to think about the environment that surrounds your home, as well as the environment that might be far away.

Introduction

People who own houses usually have a yard that surrounds their house (**figure 1**). The yard might be big or small. It might not have any trees, or it might have a lot of trees. For people who have trees surrounding their



Figure 1. A yard with trees surrounding a house.

house, the trees provide many benefits. The benefits include privacy, shade, *habitat* for birds and other wildlife, and beauty.

If people value the benefits provided by trees growing around a house, they might be willing to pay more money to purchase a house that has trees growing in its yard. The scientists in this study were interested in knowing whether the benefits provided by trees are valued by people buying a new house. They also wanted to know how much money those benefits are worth.

3. Number of rooms and bathrooms in the house
4. Whether or not the house had brick construction
5. Whether or not the house had an outside porch
6. Age of the house
7. Size of the lot
8. *Average* price of land in the neighborhood
9. Year of the sale
10. Amount of tree cover (the percentage of the lot covered by tree *canopies*)

Reflection Section



- ✿ What questions were the scientists trying to answer?
- ✿ If you were the scientist, how would you determine how much money trees are worth to people buying a new house?
- ✿ The first paragraph of the “Introduction” section lists some benefits that are provided by trees surrounding a house. Name two other possible benefits.

Method

The scientists decided to use the selling price of houses as an *indicator* of the value of trees surrounding a house. They collected information about houses that had been sold during a 3- year period. If a house had a lot size larger than 3 acres, they did not include it. (How many hectares is equal to 3 acres? Multiply by .405 to find out.) The lot size is the area of the yard plus the area that the house and other buildings take up. The scientists collected the following information about each house:

1. Selling price
2. Total amount of heated space in the house

Tree cover is the percentage of the total lot size that was covered by the canopies of trees. The scientists collected this information using *aerial* photographs (**figure 2**). They used an aerial photograph of every house and yard included in the study. On each photograph, they placed a 1-centimeter (cm) X 1-cm grid (**figure 3**). (How much is this in inches? Multiply 1 X .394 to find out.) They estimated the percentage of the entire lot size that was covered by trees. The scientists collected this information for 272 houses in Athens-Clarke County, Georgia (**figure 4**).



Figure 2. Aerial photographs were used to determine the amount of tree cover in a yard. Photo courtesy of Barrow County, Georgia.



Figure 3. Aerial photograph with the grid placed over it. Photo courtesy of Barrow County, Georgia.

The scientists then used the following equation for every house studied:

Selling price = amount of heated space + number of rooms and bathrooms + brick construction + outside porch + age of house + lot size + average price of land + year of sale + percentage of lot size covered by trees

The scientists put the values for each house into the equation. They put all of the information into a computer. A computer program was used to determine how much each of the features, such as the number of bathrooms, affected the price. Using this method, the scientists were able to determine how much the percentage of tree cover affected the price of the houses.



Figure 4. Location of Athens-Clarke County, Georgia.

Reflection Section



- ✿ Why do you think that the scientists collected information about the number of rooms, the amount of heated space, and other things for each house they studied?
- ✿ Do you think that the percentage of tree cover on a lot affected the price of the houses? Why or why not?



Thinking About Ecology

All living things exhibit behavior. Behavior is the response of an organism to something in its environment. Usually, organisms behave so that their chances of survival are increased. If their survival is not in danger, organisms will usually behave in a way that increases their benefit. For humans, the definition

of what is beneficial might vary from person to person. In this research, the behavior of humans is demonstrated by their purchase of a house. People will buy a house based on which house is thought to be most beneficial for the amount of money they are able to spend. The scientists were interested in the amount

of tree cover surrounding a house. They wanted to know if tree cover was considered beneficial by people buying houses. If tree cover was considered beneficial, it would influence the behavior of people when they chose which house to buy. ■

Findings

Of the 272 houses studied, the average house was 46 years old and had 6 rooms and 3 bathrooms. The average selling price was \$122,267. The average lot size was 0.65 acres. (How many hectares is that? See the “Method” section to calculate the size in hectares.) The average price of the lot was \$91,428 per acre. (Calculate the price of the lot for the average house in this study. To do this, multiply the price of the lot per acre times the average lot size.) The average lot had almost 60 percent tree coverage (**figure 5**). Most of the trees are on the border of the lot or in the backyard (**figure 6**).

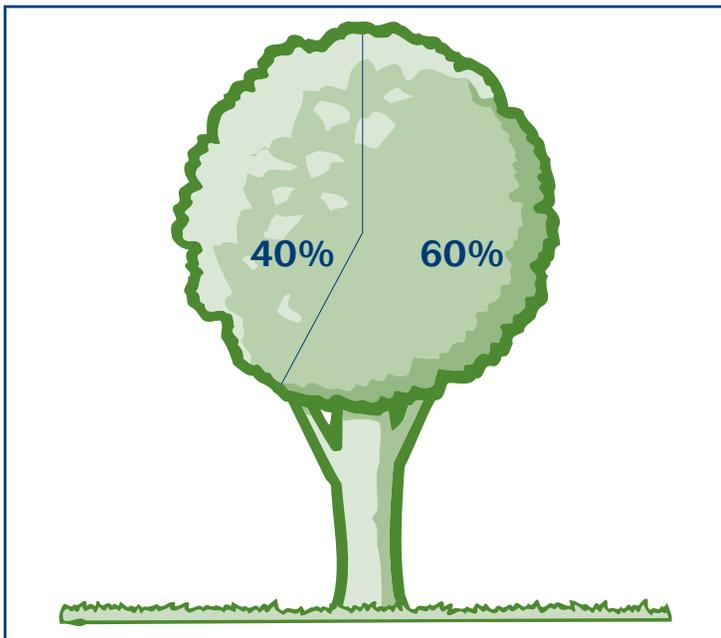


Figure 5. The average lot had almost 60 percent tree coverage.

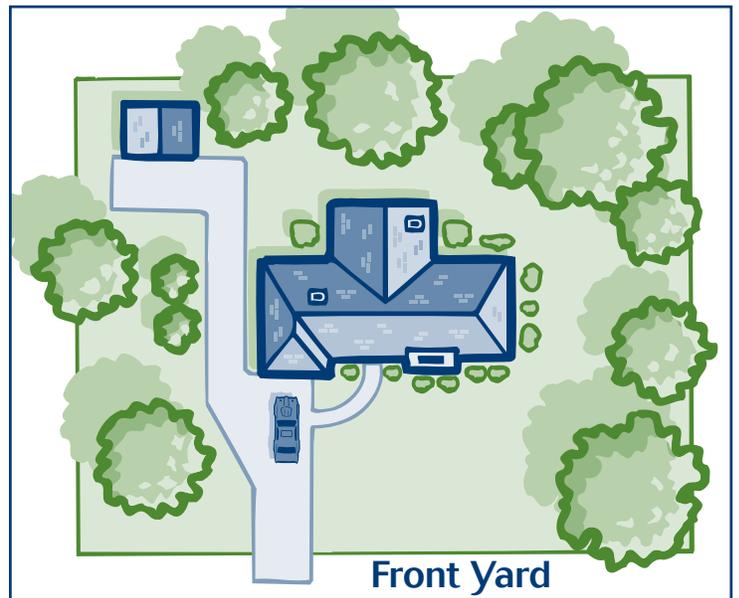


Figure 6. Location of trees on the lots.

The scientists found that trees make a difference in the selling price of a house. For every 1-percent increase in the amount of tree cover, the selling price of a house was increased by almost \$300. If the amount of tree cover was increased by 10 percent, the average price of a house was increased by almost \$3,000. The scientists also calculated the average value of different size trees for the 272 houses in this study (**figure 7**).

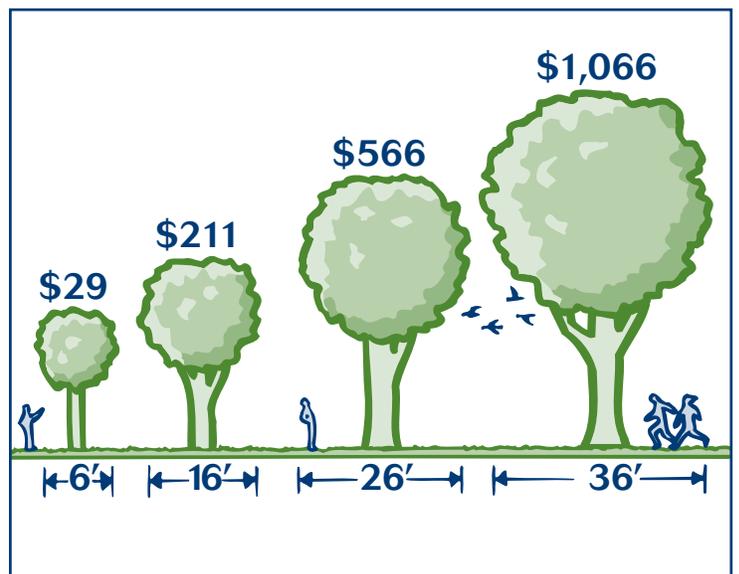


Figure 7. The average value of different size trees.

Reflection Section



- ✦ Why do you think that most of the trees were growing on the border of the lots or in the backyard?
- ✦ Athens-Clarke County is located in the Southeastern United States, where there is plenty of rain. Do you think that the amount of tree cover would affect the selling price of houses in other areas of the United States? Why or why not?
- ✦ Look at **figure 7**. What is the *relationship* between tree size and the value of a tree?

Reflection Section



- ✦ Think about how you feel about trees. Now pretend that you are getting ready to buy a house. Do you think that you would be willing to spend more money to buy a house that had more trees growing in its yard? Why or why not?

From Sydor, T., Newman, D. H., Bowker, J. M., & Cordell, H. K. (2004). Trees in residential landscapes: Comparison of empirical data from two southern states. Presented at 2004 Southern Forest Economist Workshop, St. Augustine, FL, March 14-16.

Implications

This study provides an estimate of the value of the trees that surround a house. It indicates what people are willing to pay for different percentages of tree cover when they buy a house. The study shows that trees are a positive feature of houses, and that people will pay more for a house if there is more tree cover on the lot. ■



The question you will answer with this FACTivity is: According to your own research, do your findings support the findings of this study? The method you will use to answer this question is given below.

Students—

Take three sets of six photographs home and poll three adults. For each set of six photographs, have each adult place the photographs in order of preference, from their first choice to their last choice. Ask the adult to make his or her selection based on which house he or she would pay the most to buy to which house that he or she would pay the least to buy. Ask the adult to write on the back of each card what influenced him or her to rank that particular house in the order that he or she did. Record the rank order, from 1-6, on the front of each set of six cards.

Bring your cards back to class to be analyzed with your classmates' cards. After the results have been recorded on the board, count the number of times each photograph was ranked number 1, number 2, number 3, etc., all the way to number 6. Based on the frequency of each ranking, identify, as a class, which photo was ranked overall the first choice (and most likely to bring the highest price) of the 6. Identify which photo was ranked the least favorite (and most likely to bring the lowest price). If possible, determine the overall rank order of all six photographs, based on the results of the

polling. Read some of the reasons each house was placed in its order.

Answer the question posed at the beginning of this FACTivity. Do the results of this research support the findings in this article? If they do, either House number 2 or 5 should be the first choice overall, and House number 3 or 1 should be the last choice overall.

As a class, discuss your research project. What were the reasons given for the choices made? How often did people mention the trees that surrounded the house? What might be some of the problems with the research? Other than the amount of tree cover surrounding the houses, what other things could have made people rank the photographs the way that they did? Think about things such as the way the houses looked, whether each student asked their questions in the same way, etc.

Teachers—

Before the FACTivity, make three copies of the following page on cardstock for each student. Cut the cardstock to make three sets of six photographs.

After the FACTivity, analyze the results in class. Appoint someone to record the answers on the board. Use the following form as a template.

Rank order 1= first choice to 6= last choice.



House Number 1



House Number 2



House Number 3



House Number 4



House Number 5



House Number 6

	House 3 10% Tree Cover	House 1 20% Tree Cover	House 6 30% Tree Cover	House 4 40% Tree Cover	House 5 50% Tree Cover	House 2 60% Tree Cover
Number each photograph according to your choice 1 = first and 6 = last choice.						
Student 1						
Student 2						
Student 3						
Student 4						
Student 5						
Student 6						
Student 7						
Student 8						
Student 8						
Student 9						
Student 10						
Student 11						
Student 12						
Student 13						
Student 14						
Student 15						
Student 16						